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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,416	03/23/2004	Mitsuaki Hirokawa	Q80574	2263

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EXAMINER	
MENON, KRISHNAN S	

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1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/806,416	HIROKAWA ET AL.	
	Examiner	Art Unit	
	Krishnan S. Menon	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *RCE of 10/3/07*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-5 are pending as amended in the RCE of 10/3/07.

Claim Rejections - 35 USC § 103

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 02/051528, and/or Schmidt (US 6,352,641).

WO teaches low pressure drop spiral wound modules for applications such as reverse osmosis or ultrafiltration as claimed – see example 5. The first permeate side passage material in this reference is integral with the separation membrane (membrane is coated on it!). The second permeate side passage material, which is wrapped around the core tube, is separate from the permeate side passage material (this example uses feed spacer for this).

Schmidt teaches a spiral wound element as seen in the figures and column 1 lines 8-38. Figure 2 of Schmidt also shows multiple wraps of the permeate spacer material around the core as claimed – the first and second permeate-side passage material is the same, or monolithic.

The references do not specifically teach that the effective perforated-part area (area of perforated-part multiplied by the open area of one round of permeate spacer around the core) is at least equal to the cross-sectional area of the tube. However, this factor can be optimized for lowest pressure-drop without compromising the strength of the core tube. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215

(CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). This factor is also commonly used in designing perforated tubes or cores, as seen in the reference Haq et al (US 6,702,941) (column 26, lines 34-55, which teaches that perforated area should be at lest equal to the cross-sectional area of the inlet tube to avoid perforations restricting the flow).

Response to Arguments

Applicant's arguments filed with the current RCE have been fully considered but they are not persuasive.

Argument that example 5 of Cruz uses feed spacer material is not persuasive: The example 5 of Cruz teaches using feed spacer material to wrap around the permeate tube; therefore, it is the "second permeation-side passage material" as claimed. The term 'feed spacer material' is only a name of the material used, because the material used in this reference is normally used as a feed space material. It is in the permeate passageway, and functions as a permeation side passage material in example 5 of Cruz.

Argument about the hindsight reasoning is not commensurate in scope with the rejection. The 20% assumption is based on applicant's argument that the permeation-side passage material (which incidentally, is a commercially available material) has only 20% opening. Any way, it is not relevant because applicant in claim 5 has a separate

material for this than the first permeate passage material, which is what example 5 of the WO reference teaches, and the original assumption of openings 50% or more is good.

Argument that Cruz or Schmidt fails to teach the element as a result effective variable is also not persuasive: the requirement is that ***the parameter must be recognized as a result-effective variable***, which was done with evidence. This argument is also not commensurate in scope with the rejection.

With respect to the "calculations", applicant has now amended the claims to specifically recite the area of the perforations instead of the area of the perforated tube. However, this would not make the claims patentable: the claimed limitation can still be optimized as shown.

Response to arguments from the final action of 5/4/07:

Applicant's fundamental argument for both the references are the same, that the references do not teach the specific dimensions of the central tube, tube perforations, and the % opening of the permeate spacer wrapped around the tube. Therefore, applicant concludes that the reference does not teach what is claimed.

In the RCE, applicant argues that:

"The Examiner asserts that a person of ordinary skill in the art would have provided for the claimed effective perforated-part area, based on the "very conservative" assumption that the "feed spacer mesh" disclosed in Cruz '528 would have a 50 % opening",

and that pursuant to MPEP 2144.03, it is incorrect to assume a 50% opening without evidence. Applicant also argues that feed spacer mesh disclosed in Cruz'528 is also irrelevant to the claimed effective perforated part area.

The Examiner respectfully disagrees with this argument because Cruz'528 uses feed spacer to wrap around the permeate tube in example 5. Claim recites 'the permeation-side passage material surrounding the core tube'. In the example 5 of Cruz'528, the permeation side passage material surrounding the core tube is actually the feed spacer.

Even if it were not so, and one considers the material wrapped around the permeate tube as the permeate spacer, the assumptions in the rejection are sound. According to the applicant, the permeation-side passage material has only 20% opening. The calculation presented in the final action of 10/23/06 is corrected according to this assumption and is presented below. As can be seen, it does not make any difference to the patentability.

Applicant's arguments has not addressed the rejection based on the Schmidt reference, and has not provided any evidence of patentability over the references.

With respect to the argument hat the Cruz'528 fails to recognize that the effective perforated-part area is a result effective variable: it is not necessary that the references have to show that it is a result-effective variable. The rejection has clearly shown that it is a result-effective variable, and has provided evidence in the form of the Haq reference to show how such optimizations have been traditionally done.

Response to arguments from the final action of 10/23/06, with corrections to the assumptions, is repeated below:

The examiner agrees that it is difficult for the examiner to show anticipation in this instance, because, even though there are multitudes of references that teach spiral wound membranes with permeate tube, wherein the permeate spacer is wrapped around the permeate tube at least one round, and wherein the permeate tubes have perforations or slots to carry the permeate into the tube, but none of the references specifically state the size of the tube, the length of the tube, the number and sizes of the perforations, or the percent openings of the permeate spacers. The commonly used permeate spacer material is the tricot weave material, which is very open. Even if the references do not teach what is claimed in the exact terms, applicant's claims do not have anything novel in them; the % opening through the permeate spacer wrap and the perforations taken together in series would be far more that the cross-sectional area of the permeate tube. It is also a common engineering practice to provide the are of perforations of a perforated distribution/collection tube as significantly greater than the cross-sectional area of the tube so that the perforations do not create undue flow resistance (as evidenced by the Haq reference).

Having said that, applicant's claim 1 recites "... the effective perforate part-area as calculated by multiplying the total area of the perforated parts in the core tube by the percentage of openings of one layer of the permeate-side passage material surrounding the core tube is at least 1.0 time the inner cross-sectional area of the core tube".

To prove the point further, the examiner takes the Cruz'528 reference, example 5, as an example.

Example 5 has 14" wide and 36" long membrane. Therefore, the tube length would be at least 14", and the outside diameter is given as 0.6".

Therefore, the outside cross-sectional area of the tube is $(0.6)^2*\pi/4 = 0.28$ sq.in.

The tube has 14" length. The perforated part of the tube would be within the glue lines. The reference does not provide the exact locations of the glue line on the tube. Therefore, it is conservatively assumed that it is about 2" from the tip of the tube on both ends. Thus the perforated region length of the tube is 10".

Area of the perforated-part of the tube = 10* π* 0.6 = 18.8 sq.in.

~~The feed spacer, which is wrapped around the tube in example 5, has a very open structure; as high as, or even higher than, 95%.~~ Assuming conservatively that ~~it~~ the permeate spacer wrapped around the tube is only **[[**50%**]]** **20%** open,

The effective perforated part area = The perforated part area * permeate side passageway material opening = 18.8* 0.2 **[[**0.5**]]** = ~~9.4 sq.in.~~ 3.76 sq.in.

Now,this ~~9.4 sq.in.~~ 3.76 sq.in. is a lot greater than the 0.28 sq.in. area of the outer cross-section of the tube. Naturally, the inner cross-section of the tube would be even less than 0.28 sq.in.

Thus, there is more than a prima facie case of obviousness for the claims with respect to the references sited.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

10/9/07

Krishnan S Menon
Primary Examiner
Art Unit 1797